



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/828,773   | 04/20/2004  | Badredin Fatemizadeh | 112518.00005        | 5237             |
| 26707  | 7590        | 06/19/2006           | EXAMINER            |                  |
| QUARLES & BRADY LLP<br>RENAISSANCE ONE<br>TWO NORTH CENTRAL AVENUE<br>PHOENIX, AZ 85004-2391 |             |                      | ABRAHAM, FETSUM     |                  |
|  |             |                      | ART UNIT            | PAPER NUMBER     |
|  |             |                      | 2826                |                  |

DATE MAILED: 06/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

HA

**Office Action Summary**

Application No.

10/828,773

Applicant(s)

FATEMIZADEH ET AL.

Examiner

Fetsum Abraham

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 March 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 13, 15-17, 19, 22-27 and 29-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22-26 and 31 is/are allowed.
- 6) ☒ Claim(s) 13, 15-17, 19 and 30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

**Final Action**

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. None of the drawings show the claimed structure in claim 30: The omitted structural cooperative relationships are: the semiconductor material, first-third regions in an integrated structure with the claimed physical relationship.

The feature(s) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81. No new matter may be introduced in the required drawing.

Applicant is given a TWO MONTH time period to submit a drawing in compliance with 37 CFR 1.81. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a). Failure to timely submit a drawing will result in **ABANDONMENT** of the application.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 30 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete (concerning the physical presence and relationship between said semiconductor material, first-third regions in integrated system as claimed) for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: the semiconductor material, first-third regions in an integrated structure with the claimed physical relationship.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 13,31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatakeama et al (6,855,970).**

As for claims 13,31, the patent discloses a JFET structure in figures 1 and 26 comprising a gate region (15), an epitaxial layer (28) of first n-type conductivity type, a first p-type first region (12) within the epitaxial layer, a second (p-) region (9) adjacent to a first portion of the first region the first portion being one of then three side surfaces layer region (90 is in direct contact with, a trench for depositing the gate region formed within the epitaxial layer.

The prior art discloses all subject matter but a “third region” of the second conductivity type adjacent the second portion of the first region. However, the limitation is met by layer (9) that extends through at least three side surfaces of the first region (9). Clearly, region 9 may have been formed by a single process in the patent and the claimed third region may have been formed by a separate process in the claimed invention, however the end result is similar in both structures at least so far as the claimed invention is concerned. The p- region (9) in the three side surfaces of the first region (12) has lower concentration then the concentration of region (12).

To discuss the matter further, the examiner assumes that the claimed structure may be figure 4 in the application. That structure has second and third regions (64) separated by layer (62) at least physically, but the regions form a continuous structure electrically because layer (62) is a highly conductive element.

Please note that the expression “sufficient depth” of the semiconductor material and its effects on source to drain resistance is thought to be subjective interpretation in the context of claim 31, because the depth is not physically quantified in relation to any other element in the claimed structure.

Therefore, it would have been obvious to one skilled in the art to conclude that the claimed structure was a duplicate of the structure in the patent in its final form.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

**Claims 15-17,19 are rejected under 35 U.S.C. 102(a) as being anticipated by Hatakeama et al (6,855,970).**

As for claims 15,16,17,19 the patent discloses a JFET structure in figures 1 and 26 comprising a gate region (15), an epitaxial layer (28) of first n-type conductivity type, a first p-type first region (12) within the epitaxial layer, a second (p-) region (9) adjacent to a first portion of the first region the first portion being one of then three side surfaces layer region (9), and a drain region (1) below the epitaxial layer and a source region (3a) on the epitaxial region.

Claims 22-27,29,30,32 have been allowed.

is in direct contact with, a trench for depositing the gate region formed within the epitaxial layer.

As for claims 15,19, the patent discloses a JFET structure in figures 1 and 26 comprising a gate line (18) in contact with gate region (15) , an epitaxial layer (2) of first conductivity type (n-type), a first second conductivity type (P-type) region (12) deposited within the epitaxial layer directly under the gate, a second conductivity type (P-type) region (9) of less impurity concentration than the first second conductivity type (P-type) region formed under the first second conductivity type region (12), a trench for depositing the gate region formed in the

epitaxial layer, a drain region (1) disposed below the epitaxial layer, and a source region (3a) over the first portion of the epitaxial layer.

As for claim 16, the first conductivity type is N-type material.

As for claim 17, the first region is a P+ type and the second region is a P- region semiconductor material.

Claims 22-26,31 have been allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fetsum Abraham whose telephone number is: 571-272-1911. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915.

Fetsum Abraham  
6/9/06

